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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/558,150	11/21/2005	Amir Mortazawi	RUN-112-B	2144

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EXAMINER	
LEE, BENNY T	

ART UNIT	PAPER NUMBER
2817	

NOTIFICATION DATE	DELIVERY MODE
11/21/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/558,150	MORTAZAWI ET AL.	
	Examiner	Art Unit	
	Benny Lee	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10 and 33-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10* is/are allowed.

6)☒ Claim(s) *33,35-39; 40-44; 45-51* is/are rejected.

7)☒ Claim(s) *34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 August 2008* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

The substitute specification filed 21 August 2008 has been disapproved for reasons and objections set forth below:

A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because the clean copy of the substitute specification filed 21 August 2008 does not have paragraphs numbered in consecutive order. For example, paragraphs [0004], [0010], [0012], etc have been deleted in their entirety and thus the remaining paragraphs should be renumbered as to have paragraphs numbered in consecutive order (e.g. original paragraph [0005] should be renumbered as paragraph [0004] and so forth).

A substitute specification must not contain new matter. The substitute specification must be submitted with markings showing all the changes relative to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) and a statement that the substitute specification contains no new matter must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown.

The disclosure is objected to because of the following informalities in the disapproved substitute specification of 21 August 2008: In paragraph [0044], it is noted that if reference label "l_2" is "not shown in FIG. 1", then it should be made clear where such a reference label is shown. Clarification is needed. In paragraphs [0045] & [0051], note that reference label "L" does not

appear consistent with the labeling in FIG. 2 (i.e. L_1, L_2, L_{N-1}, etc appear in FIG. 2) and needs clarification. In paragraph [0060], note that reference to parameter "3(G+jB)" is vague in meaning and needs clarification. In paragraph [0062], note that "p-I-n" should be correctly written as --p-i-n-- for an appropriate characterization. Note that a detail description of new FIGS. 26 & 27 needs to be provided. Appropriate correction is required.

The disclosure is objected to because of the following informalities: Note that in the description of the circuits depicted in Figs. 1, 2, 3, 10, 13, 14, 15, 21, all reference labels which are unique to a particular drawing figure should be corresponding described in the specification for clarity of description. As noted earlier by applicants', any reference label appearing in a particular drawing figure and which has already been described relative to an earlier drawing figure need not be further described. Note that respect to the graphs depicted in Figs. 4, 5, 6, 8, 10, 12, 16, 17, 18, 20, 23, 24, 25, further elaboration of important aspects or features depicted by the curves in the respective graphs should be provided for clarity of description. Appropriate correction is required.

The use of the trademark "RT/DUROID" (e.g. paragraphs [0049] & [0067]) has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology. In particular, note that the generic terminology for RT/DUROID should be provided.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

The drawings are objected to because of the following: In Fig. 13, note that reference labels --2(G-jB)-- & --3(G+jB)-- still need to be provided such as to be commensurate with the specification description thereof.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claims 41-44; 45-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 41, note that it is unclear with respect to which one of the "antenna cells" is the recitation of the "extended resonance circuit"& the "power divider", respectively intended.

In claims 42, 43, 44, similarly, it is unclear with respect to which one of the "antenna cells" is the recitation off the "tunable inductance" & "tunable capacitance" intended.

In claim 45, last paragraph therein, note that "the single circuit means for tuning" lacks strict antecedent basis.

In claims 47-50, note that it is unclear with respect to which ones of the "N plurality of ports" is the recitation of the "first impedance" intended.

The following claims have been found to be objectionable for reasons set forth below:

In claim 34, lines 6, 7 & claim 46, line 6, note that "its conjugate" should be rephrased for an appropriate characterization.

In claim 41, it is noted that a status identifier should be provided for this claim.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 33, 35-39; 40-44; 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Sullivan et al or Kirino in view of Hopwood et al (all of record).

Sullivan et al (e.g. Fig. 1) or Kirino {e.g. Fig. 7(b)} each disclose a one dimensional phase array antenna (e.g. 10 in Sullivan et al; 801 in Kirino) comprising a plurality of series connected or cascaded phase shift elements (e.g. 15-A to 15-D in Sullivan et al; 805a, 805b, 805c in Kirino) defining a plurality of divider ports located between adjacent phase shift elements

separated by a prescribed distance and to which respective antennas (e.g. antenna elements 11 in Sullivan et al; radiating patches 804a-804d in Kirino) are connected. An alternating signal source (e.g. RF source 13 in Sullivan; an un-shown signal source connected to feeding terminal 807 in Kirino) is connected to a first of the divider ports for supplying a signal to the phase array antenna through the series connected phase shift elements. Note that as the signal applied by the source propagates through the series connected phase shift elements, each phase shift element imparts a desired amount of phase shift (e.g. phase shift Θ in Sullivan et al; phase shift Φ in Kirino) as to provide a successive phase difference to the propagating signal at each dividing port such that the signal is radiated by the corresponding antenna with the different amount of phase shift. However, the phase array antenna of either Sullivan et al or Kirino differs from the claimed invention since the phase shift elements do not explicitly disclose first series tunable elements and second tunable elements parallel connected to a respective antenna.

Hopwood et al discloses, with respect to Fig. 6, a phase shifter configuration comprising a plurality of series connected or cascaded phase shift elements. Note that each individual phase shift element in the series connection further comprises two series connected varactors (e.g. 72, 74) and a parallel or "shunt" connected varactor (76), where the two inductors are considered "tunable" by virtue of being designed to a different inductive reactance and where the varactor is considered tunable by the application of control voltage (69) to change the capacitance (e.g. either continuously or discretely by virtue of the type of control voltage 69) of the varactor as depicted in the general description of Fig. 5. Moreover, it should be noted that such series connected inductors, by virtue of the designed inductive reactance, would necessarily provide an

impedance inversion from one end to an inductor to the other end of the inductor, as known to those of ordinary skill in the art.

Accordingly, it would have been obvious in view of the references, taken as a whole, to have realized the series connection of phase shift elements in either phase array antenna of Sullivan et al or Kirino to have been realized by a series connected phase shift configuration as taught by Fig. 6 of Hopwood et al. Such a modification would have been considered an obvious substitution of art recognized equivalent series connected phase shift configurations, thereby suggesting the obviousness of such a modification. It should be noted that the series connection of plural phase shift elements as taught by Hopwood et al would obviously have been compatible with the series connection of the generic phase shift elements in either Sullivan et al or Kirino, thereby further suggesting the obviousness of such a modification. It should be noted that as an obvious consequence of using the series connected phase shift elements of Hopwood et al, such a combination would have necessarily included the respective varactors being connected in parallel with the corresponding antenna, such as to have been consistent with the teaching in either primary reference (i.e. plural antenna) as modified by Hopwood et al (i.e. parallel varactors). Moreover, as known to those of ordinary skill in the art, each of the inductors can be alternatively be realized by transmission line portions designed to a desired length (e.g. quarter wavelength corresponding to a desired inductive reactance) as an obvious design consideration. Similarly, by virtue of designing the two inductors to be quarter wavelength each, the corresponding electrical length of the equivalent transmission line would obviously have been one-half wavelength, thereby providing a half-wavelength distance between adjacent antennas through the series connected phase shift elements.

Applicant's arguments filed 21 August 2008 have been fully considered but they are not persuasive.

With respect to the references applied in the above rejection, applicants' have contended that each reference "has no commonality with the present invention". In particular, it has been emphasized by applicants' that the inventive concept requires the phase shifters and power dividers to be one in the same entity and thus performs phase shifting and power dividing simultaneously as contrasted to the prior art references where a phase shifter is required for each antenna block. It has been further asserted that the inventive approach would result in a less costly and less complicated arrangement as compared to the prior art. Moreover, specifically with respect to the Hopwood et al reference, applicants' contend that the phase shifter configuration therein are considered to be blocks to be inserted into the feeding path of each antenna.

In response, the examiner has considered applicants' assertions, but have found such assertions unpersuasive. In particular, the examiner is unable to ascertain whether there is any difference between applicants' claimed invention and the prior art references, especially the Sullivan et al or Kirino references. In each one of the Sullivan et al and Kirino references, these reference appear to have a serial feed path with a respective phase shifters therein which must necessarily function to provide phase shift and power division simultaneously. That is to say, a signal applied by the power source traveling through the serial feed path must necessarily experience power division by virtue of the plurality of spaced ports or terminals (i.e. as the signal passes by these ports or terminals, a portion of the signal is coupled out, thereby providing power division) and must also necessarily experience a corresponding phase shift by virtue of thesignal

passing through the phase shifters disposed in the serial feed path. Thus, by virtue of the phase shifters arranged in the serial feed path in each prior art reference, the examiner believes that such a configuration must necessarily function to provide a phase shift and power division simultaneously. Thus the examiner believes that there is no patentable distinction between applicants' inventive concept of simultaneous phase shift and power division and the configuration in the either the Sullivan et al or Kirino references and therefore applicants' need to provide further elaboration as to any distinction there between. As for the Hopwood et al reference, it should be noted that even if the Hopwood et al phase shifter were to be used for each phase shifter block in any one of the Sullivan et al and Kirino references, such a configuration would not have affected the simultaneous phase shift and power division provided by the serial feed arrangement of either the Sullivan et al or Kirino reference. Finally, it must be pointed out any purported advantages of the inventive concept with respect to less cost and less complicated structure as compared to the prior art references are not commensurate with what is claimed (i.e. the issues of less cost and less complication are not reflected in what is actually claimed).

Claim 34 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim.

Claim 10 is allowable over the prior art of record.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to Benny Lee at telephone number 571 272 1764.

B. Lee

/BENNY LEE/
PRIMARY EXAMINER
ART UNIT 2817